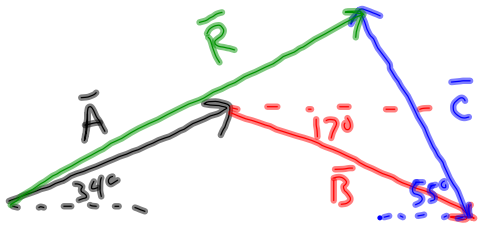
Vector Problem Types:

1. Resultant / Components
2. Hanging Objects
3. River
4. Rope pulling an object on a horizontal surface
5. Inclined planes

TEST Monday

Add the following vectors graphically and algebraically: 10 N at 34 degrees North of East, 15 N at 17 degrees South of East, and 12 N at 55 degrees North of West.

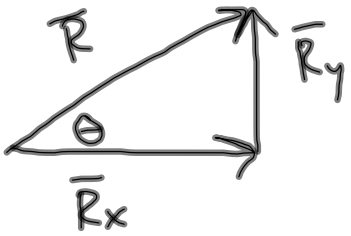


$A_x = +8.29\ N$ $\quad A_y = +5.51\ N$

$B_x = +14.34\ N$ $\quad B_y = -4.39\ N$

$C_x = -6.88\ N$ $\quad C_y = +9.83\ N$

$R_x = +15.15\ N$ $\quad R_y = +11.03\ N$



$R = 19.23\ N$ from Pythagorean theorem

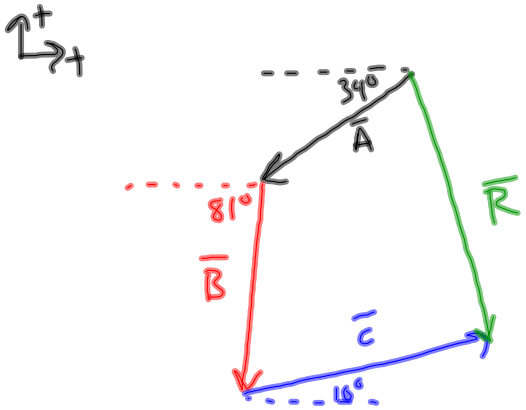
$\theta = 35°$ from $\tan^{-1}$

N of E

$\bar{R} = 19.23\ N\ @\ 35°$ N of E

Vector Notes and Practice Problems 3.26.12 Honors Physics

Add the following vectors graphically and algebraically: 44 N at 34 degrees South of West, 50 N at 81 degrees South of West, and 40 N at 10 degrees North of East.

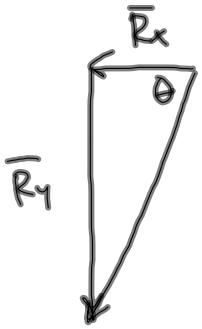


$A_x = -36.4\,N$ $\quad A_y = -24.6\,N$

$B_x = -7.82\,N$ $\quad B_y = -49.38\,N$

$C_x = +39.39\,N$ $\quad C_y = +6.8\,N$

$R_x = -43.91\,N$ $\quad R_y = -67.03\,N$



$R = 67.21\,N$

$\theta = 85.8°$

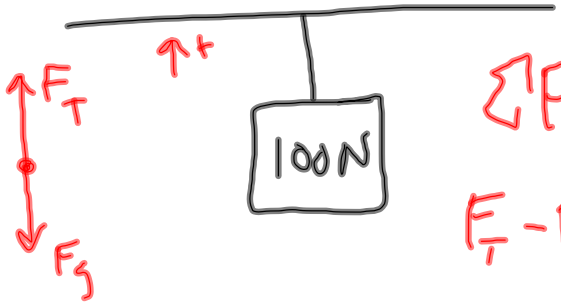
S of W

* I drew the resultant wrongly on the graphical addition part.

$\bar{R} = 67.21\,N$ @ $85.5°$ S of W

Hanging Objects:

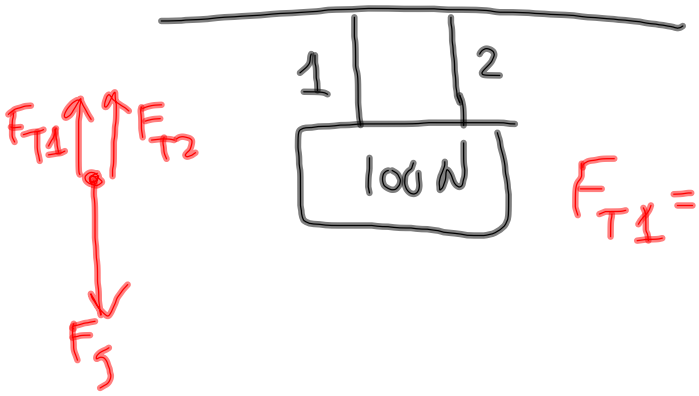
* NO acceleration



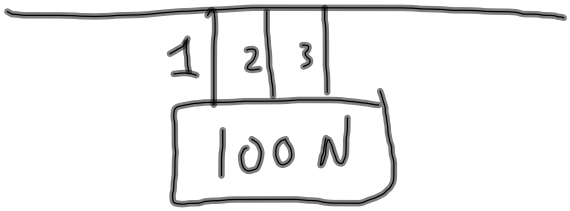
$\Sigma F = 0$

$F_T - F_g = 0$

$F_T = F_g = 100N$



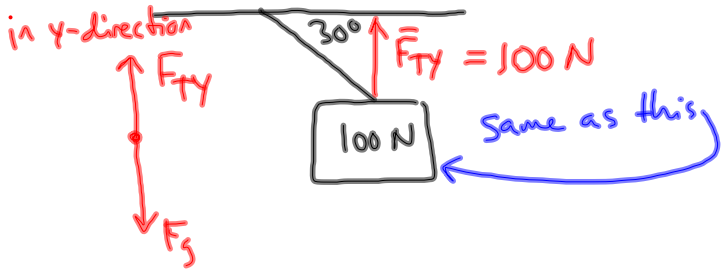
$F_{T1} = F_{T2} = 50N$



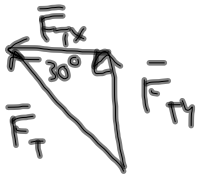
$F_{T1} = F_{T2} = F_{T3} = 33.3N$

Tension divided evenly between all ropes if they all hang straight down.

* We are now using a rigid metal rod so that the object doesn't move.



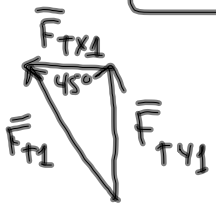
Find total tension → $\bar{F}_T$



$$\sin(30°) = \frac{F_{TY}}{F_T}$$

$$F_T = \frac{F_{TY}}{\sin(30°)}$$

$$= 200\ N$$



$$F_{TY1} = F_{T2} = 250\ N$$

$$\sin(45°) = \frac{F_{TY1}}{F_{T1}}$$

$$F_{T1} = \frac{F_{TY1}}{\sin(45°)}$$

$$= 353.6\ N$$